

Middle East and North Africa countries' agricultural export potentials under trade reforms

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Middle East and North Africa Countries' Agricultural Export Potentials under Trade Reforms

1. Introduction

Middle East and North Africa (MENA)¹ countries, amid a globalized and changed world, could significantly contribute to tackle the world's upheavals of today – illegal immigration, economic stagnation, political unrest, public's uproar – providing that their own course to economic growth and stability is ensured. Since 1995, the EU has acknowledged this important universal role of MENA countries, by the so called Barcelona agreement and attempted to expand its trade and relations to this particular region. Strengthening the vital economic sectors of MENA countries via free trade safeguards a steady development course for the whole region. Agriculture, a major economic component and employment provider for all MENA countries, constitutes, perhaps, an important economic sector². At large, MENA countries concentrate on exporting agricultural products, in particular fruits-vegetables-olive oil or cotton and wheat. Though intra-MENA trade constitutes a significant part of their transactions, "extra" trade is taking place mainly between MENA countries and EU, roughly half of MENA countries exports target the EU and a significant part of their imports originates from EU too (Achy and Sekat, 2003).

Forthcoming trade reforms, either in a global, WTO, or a regional level, EU-Med Partnership (Kniper and dell' Aquila, 2004) can substantially influence MENA countries' export orientation, and subsequently, the pace of their economic growth. EU-Med Association Agreements, of great importance for MENA countries, were

established in 1995, summit of Barcelona³, and a new roadmap was drafted in November 2005. According to this roadmap, a detailed evolution plan of trade liberalization will be negotiated, started in 2006, between the EU and Mediterranean Partner Countries.

Trade liberalization is strictly related to changes in employment and economic growth rates and in relative prices (Martin, 2004). The effects of the liberalization on MENA countries have attracted the interest of several scholars (Augier and Gasiorek, 2003; Nabli and Veganzones-Varoudakis, 2004; Abu-Qarn and Abu-Bader, 2004; Siliverstovs and Herzer, 2007), while the agricultural export performance have not considered in particular. However, in non-MENA countries, trade liberalization and the impact on agricultural sector have been introduced (Hertel, 1999; Hertel et al, 2000; Gohin and Meyers, 2002; Keeney and Hertel, 2005; Valenzuela et al, 2006). The premise in this work is that agricultural exports form the underpinnings to build up smoothly and gradually the rest of the economic sectors, as it can refrain huge labor force and foster regional development. Thus, a particular focus is given on agricultural exports.

The purpose of this work is to assess the likely impacts due to undergoing trade reforms, WTO or EU-Med agreements, upon the MENA countries with a particular emphasis on agricultural trade. Several trade reform options are studied using a global trade model. A global analysis of this type provides insights into various agricultural trade options and indicates what the potential effects on MENA countries would be, both positive and negative.

To understand the potential effects and to trace out probable directions of the expected changes, three distinct scenarios were defined from a broader spectrum of anticipated trade reforms. Certainly, the examined scenarios do not represent the real pace of WTO or EU-Med partnership reforms in terms of details in application and needed time span to be completed. Nevertheless, the scenarios can serve the goals and the focus of this work to provide a policy supporting base. The three scenarios to be examined are the following: first, global trade reform (scenario - 1) elimination of all tariffs on agricultural imports and subsidies on agricultural exports throughout the world is assumed; second, EU and MENA trade agreement (scenario - 2) removal of all trade barriers on agricultural products is achieved; third, MENA special provisions (scenario - 3) agricultural exports of MENA countries face no trade barriers but MENA countries maintain their barriers to agricultural imported goods (non-reciprocity), an option that can be granted to developing countries in a WTO agreement.

In the next section the methodology and data are briefly presented, while in section three the results of the various trade reform scenarios are given. Finally, in the sections to follow, the effect of bilateral trade agreements between MENA countries and EU are explored. The paper ends up with the main conclusions and implications.

2. Methodology and data

Computable general equilibrium model (CGE)⁴, a widely followed approach in trade analysis, and GTAP global database (1997) were used (McDougall et al, 1998;

Tongzon, 2001) to cast the trade reform impacts. An overview of the GTAP model is analytically described by Hertel and Tsigas (1997) The (CGE) model was developed by Diao et al. (2001), and details are not provided here as can be easily found in the relative literature. The CGE model is global in the sense that all regions of the world are included, and production and consumption decisions in each region follow behavior that is consistent with economic theory. Trade flows among regions are multilateral and world prices are determined by world market clearing conditions or, in other words, excess demand for each commodity in the world is zero. The general equilibrium feature of the model means that resources can move among sectors, securing consistent changes among all sectors (Diao and Somwaru, 2001). Thus, adjustments in the livestock sector, for example, are consistent with adjustments in the feed grains sector.

The assumption that labor and capital are mobile between agriculture and non-agricultural sectors is introduced. Relaxing this assumption would slow the supply response from countries having a comparative advantage in world agricultural markets causing world agricultural prices to rise more than the predicted increase in this analysis. Moreover, the assumption that labor is fully employed places upward pressure on prices, since abundant labor is likely in MENA countries, supply response can occur at a lower cost.

A “base” scenario was developed initially to represent a stylized view of agricultural production and trade in the world under current trade policies. First, a global trade reform scenario was simulated (scenario - 1). In this scenario, all tariffs and export

subsidies on agricultural imports are eliminated, while other agricultural policies remain unchanged. Second, EU and MENA countries trade agreement (scenario - 2), a bilateral regional trade agreement, removing all trade barriers on agricultural products is established. In this scenario, the benefit/loss with global trade reform is contrasted. Finally, MENA countries are treated specially and differentially under the provisions in the Agreement on Agriculture for developing countries (scenario-3). In this scenario, trade policies of MENA countries remain in place while MENA countries do not make tariff concessions, given the region's economic development status. Implementation of special and differential treatment would help industrial development and export promotion efforts of MENA countries.

Four indicators were used to assess the effects of agricultural liberalization on each country/region. These are: (a) changes in world agricultural prices, (b) changes in the volume of world agricultural trade, (c) changes in exports and imports, and (d) changes in welfare and gross domestic product. The analysis is based on the 1998 levels of applied agricultural tariffs, domestic support and export subsidies, and the use of tariff rate quotas. Caveats need to be noted. First, tariff rates and tariff equivalent rates are based on the 1998 data. Since tariff reductions have been undertaken by many countries after 1998, and since the bound rates are much higher than the applied rates in many cases, the analysis may overestimate the extent of tariff reduction that would take effect after 2000 for some countries. In this situation, the analysis may overestimate the extent of all import barriers.

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3. Global Trade Reform (Scenario - 1)

Though this is a very extreme and unrealistic scenario, assumed that all tariffs on agricultural imports and subsidies on agricultural exports worldwide are eliminated, it can provide valuable information on the direction of anticipated changes in a completely free trade for agricultural commodities.

From a theoretical point of view, restricting imports in the *import-protecting* countries causes domestic consumers to face higher food prices than world prices and to employ more resources in agriculture. Eliminating import tariffs will induce a demand rise for agricultural imported goods and a supply drop of domestic produced products, placing upward pressure on world agricultural prices. This upward pressure in turn induces agricultural exporting countries to increase production. This is in line with the results, as the level of world agricultural prices rises by 11.6 per cent relative to the level of world non-agricultural prices, the worldwide agricultural production increases by 1.15 per cent and the trade flows in value and volume increase by 40 and 23 per cent, respectively.

The well-accepted equivalent variation (often referred to as the willingness to pay) is used to measure the social welfare gains or losses due to trade liberalization. One-time welfare effects are considered. The one-time effects are measured by using the status-quo (pre-reform) prices as the base, and address the question: what income would be equivalent to the change brought about by the trade liberalization (Varian, 1984). The

welfare effects over time are measured by summing the discounted value of this measure over time.

Welfare effects of trade reform suggest that consumers can be worse off if the country's terms of trade deteriorate following liberalization. That is, if the prices of the goods a country exports fall relative to the prices of goods the country imports, then consumers can be adversely affected since their expenditures on imported goods increase while their income from exported goods falls.

As table 1 shows, most countries, but MENA countries, experience an increase in welfare measured by changes in GDP and equivalent variation that accounts for the welfare gains or losses due to agricultural trade liberalization. The negative effect of global trade reform on MENA welfare is mainly caused by erosion in the preferential treatment by the EU. EU has granted special trade preferences to the MENA countries. After worldwide reform, MENA countries may experience a welfare loss because they suffer a decline in demand for agricultural goods that would have been exported to the EU. In other words, MENA countries will experience deterioration in their terms of trade as a result of global reform in the agricultural sector (namely, net importers of agricultural products).

Since trade liberalization enhances trade, growth in agriculture trade is expected worldwide. Indeed, model results indicate that world agricultural trade increases substantially after liberalization. Removal of all agricultural trade protection worldwide

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results in an increase in the value of world agricultural trade by almost forty per cent (Table 1).

Trade flows by country/region will be substantially influenced as provided in table 2. Australia, New Zealand, the EU, the U.S., and Japan will benefit the most from export growth. Value changes in exports will reach almost fifty per cent for the EU and the U.S.. MENA countries' exports will rise by 29.57 per cent. Changes in agricultural import values depict a very different story from that of exports as the highest increase in imports occurs in MENA countries, followed by Japan and the EU. As the paper focuses on MENA countries, table 3 presents changes in commodity trade flow for twelve agricultural commodity/aggregates.

For MENA countries, vegetables, fruits, and olive oil products are of paramount importance and changes in exports / imports in those sectors would play a significant role in the agricultural economy of the MENA region. Under scenario - 1 exports and imports of vegetables and fruits, in value terms, increase by 28 and 148 per cent, respectively. Almost the same pattern is followed by olive oil products where the increase in imports counterbalances the increase in exports.

Looking at export / import changes of agricultural products under this scenario, the effects are devastating for the economy. The imports increase outweighs the exports increase for all agricultural products. Thus, an abrupt liberalization of the agricultural trade may bring the whole economy to disarray, since the agricultural sector will suffer

the most. In this respect, pursuing a gradual liberalization in agricultural markets may ease the negative effects.

4. EU and MENA Trade Agreement (Scenario - 2)

Under this scenario, the EU and MENA countries sign a bilateral regional agreement, abolishing all current trade barriers on agricultural products. This scenario tries somehow to depict the current EU-Med agreement roadmap in an abstracting way. In accordance with the Barcelona agreement, and the follow-up agreements, this is the ultimate goal that may come into effect in 2010 or afterwards.

From an economic point of view, this scenario can be classified as a regional or bilateral agreement. Two main changes in the trade are expected, the “trade creation” and the “trade diversion”. Trade creation occurs if the agreement permits efficient producers in one member country to sell into a previously protected neighbouring market without affecting the exports of more efficient non-members. When trade-creation occurs, capital and other factors of production are reallocated toward more efficient uses, raising the returns to those factors and improving the overall economic welfare of members. Countries outside a trade-creation agreement could benefit as well, if the efficiency and welfare gains in member countries generate trade and growth opportunities for non-members. Trade-diversion, on the other hand, causes importers to switch from more efficient suppliers outside the agreement to less efficient suppliers within the agreement, distorting the allocation of resources and harming non-members of the agreement.

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MENA countries are expected to gain from the trade-creation effects of a regional agreement with the EU. Factors of production would be reallocated within the MENA countries economy towards the more competitive sectors, as producers take advantage of the new export opportunities and as imports rise to challenge the less competitive sectors. The less competitive sectors of the MENA countries would decline, but gains in the competitive sectors would offset those losses.

Under this scenario world prices of agricultural products increase by 4.2 per cent while worldwide trade in value and volume increases by 1.46 and 0.92, respectively. As expected, welfare in EU and MENA countries, would increase minimally. Trade flows between EU and MENA countries increase both in value and volume, that is trade creation, while trade diversion may result in the countries outside the agreement (table 2, second column). What is worth noting is that the rate of exports increase is higher for the MENA countries than for the EU, backing the premise that EU-Med agreements can boost their agricultural exports.

As the results of this scenario reflect to a large extent the expected changes due to completion of Barcelona roadmap, the results in table 3 shed light on the mix of agricultural trade. The main agricultural production of the MENA countries, that is fruits, vegetables and olive oil, benefit substantially from liberalizing agricultural trade. This change is expected to have spillover effects on the whole economy of MENA

countries and in particular on the food processing industry, associated with the aforementioned commodities.

5. MENA Special Provisions (Scenario - 3)

The Uruguay Round Agreements contain special provisions for developing countries that can be granted to them, among other things, long and gradual phase-in periods for their commitments and fewer obligations in some sectors (The World Bank, 2003). As a consequence, and in order to glean the full benefits from trade openness or trade reforms, MENA countries can take advantage of the market access provisions and adopt adjustments designed to improve their supply response. The trade impact of the reductions in tariff levels on the exports of any one individual MENA country depends on the treatment granted to its products by the importing countries (Michalek, 2005).

In order to evaluate the impact of export potentials of MENA countries, under this scenario, it is allowed MENA countries' exports to face duty-free trade status. As expected, agricultural exports of MENA countries' are grown. Results (table 2) reveal that MENA countries' trade flows increase the most. MENA countries' exports (value) would increase by 35.10 per cent and imports by 25.19 per cent. In other words, special provisions treatment induces MENA countries' trade more than in case of scenario 1 or 2. It is clear from the results of this scenario, that MENA countries benefit the most as they are granted a preferential treatment in the world trade. As it could have been

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expected, the welfare gains are minimal, though that a slight increase in the world trade was registered (Table 1).

Furthermore, a glance at the results in table 3 reveals that for the most of agricultural products a significant export upsurge was recorded. Having in mind that table 3 reflects percentage changes, in can be deducted that increase in vegetables and fruits exports will induce the expansion of the whole sector. This increase will be very conducive for the whole economy of the MENA countries, as agricultural activities, in particular fruits and vegetables, employ the vast majority of the population.

6. Concluding remarks

Over the last years, MENA countries have attracted the focus of the EU as they present a close and growing market and they maintain huge population reserves, not to mention energy reserves too, that can serve to the EU’s consumption and production engine. Thus, EU very early (1995) engaged in negotiations with Mediterranean countries and signed the EU-Med partnership agreements, aiming at strengthening the bilateral trade and developing the whole Mediterranean area. in line with this agreement, enhancing the EU-MENA countries trade is the larger strategic and prior perspective; but the particular importance of agriculture in retaining the labor surpluses and boosting the development of close related sectors, food and processing industry must not be undermined. The agriculture trade between MENA countries and the EU is of a great importance, as more

than half of their exports are destined to the EU and a significant part of their imports originates from EU too.

The trade liberalization process either through EU-Med agreement or WTO could cause substantial changes upon MENA countries trade, growth and welfare. With particular focus on agricultural trade, a Global CGE model was employed to trace out probable impacts of alternative trade liberalization options on MENA countries. Since trade relations through time can be influenced by several non-measurable and unforeseen factors, the assessment of trade liberalization impacts, beyond being a laborious task, is a complex process. Nevertheless, the application of this modeling process can be proven conducive to the discussion of future policy reforms on the base of sound empirical results.

The modeling proceeds first by developing a “base” scenario to represent a stylized view of agricultural production and trade in the world under the current trade policies. Then, the modeling carries on by building up a global trade reform scenario, where all tariffs and export subsidies on agricultural commodities are eliminated, a full liberalization scenario. Same process is repeated by simulating a scenario that represents somehow the EU-Med agreements. According to this scenario, all trade barriers upon agricultural commodities between the EU and MENA countries are removed. Finally, the last scenario roughly represents WTO agreements, where preferential provisions are granted to developing countries, exports from MENA countries face no trade barriers while barriers to imports remain intact.

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As expected, results reveal that trade volume, welfare and production of MENA countries are substantially influenced by the liberalization scenarios. The direction of ensuing changes, and changes magnitude to a certain extent, varies significantly among the three formulated scenarios. Thus, results can signal valuable indications to EU and MENA countries policy makers on the pursued trade and integration policies. In particular, scenario - 3, MENA countries were granted special provisions, proved to be the most beneficial for them, followed by scenario - 2, reflecting the EU-Med agreements. Regarding the gains in terms of exports, both scenario - 2 and scenario - 3 could induce a substantial export growth.

Finally, export/import flows of agricultural commodities are cast by the model in each and every assumed scenario. Again, scenario – 2 and scenario – 3 yield the most favorable outcome for vegetables and fruits, and olive oil products, the most vital agricultural commodities for the MENA countries. Exports increase in the aforementioned commodities would foster the agricultural economy and could bring about spillover effects on the local food and processing industry. Sequentially, the drafted roadmap by the EU-Med agreements seems to be beneficial for both the EU and MENA countries and can serve as a safe pace towards further trade liberalization.

Notes

¹ Turkey, Morocco, Algeria, Tunisia, Egypt, Lebanon, Libya, Syria, Israel, Gaza Strip and West Bank, and Jordan.

² The Average Agriculture’s share for MENA countries in the GDP and Exports exceeds the 10 per cent.

³ The so-called Barcelona Agreement is implemented through Association Agreements with each one of the Mediterranean Partner Countries, and the aim of this Agreement is the formation of a Free Trade Area after 2010.

⁴ Model is documented in DiaO and Somwaru (2002) and short description is provided in the Appendix.

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References

- Abu-Qarn, A.S. and S. Abu-Bader (2004) The validity of the ELG hypothesis in the MENA region: cointegration and error correction model analysis, *Applied Economics*, **36**, 1685-1695.
- Achy, L. and K. Sekkat (2003) The European Single Currency and MENA's Exports to Europe, *Review of Development Economics*, **7(4)**, 563-582.
- Augier, P. and M. Gasiorok (2003) The welfare implications of trade liberalization between the Southern Mediterranean and the EU, *Applied Economics*, **35**, 1171-1190.
- Diao, X., T. Roe and A. Somwaru (2002) Developing Country Interests in Agricultural Reforms Under the World Trade Organization, *American Journal of Agricultural Economics*, **84(August)**, 782-790.
- Diao, X. and A. Somwaru (2001) A Dynamic Evaluation of the Effects of A Free trade Area of the Americas – An Intertemporal, Global General Equilibrium Model, *Journal of Regional Integration*, **16(1)**, 21-47.
- Diao, X., A. Somwaru, and T. Roe (2001) A Global Analysis of Agricultural Reform in WTO Member Countries, in *Agricultural Policy Reform in the WTO: The Road Ahead*, USDA/ERS Agricultural Economic Report No. 802:25-40.
- Gohin, A. and C. Meyers (2002) The phasing out of export subsidies: Impacts on EU agriculture, paper prepared for the International Conference on Policy Modelling (EcoMod 2002), Brussels, July 4-6, 2002.

Hertel, T.W. (1999) Applied General Equilibrium Analysis of Agricultural and Resource Policies, Staff paper 99-2, Dept. of Agricultural Economics, Purdue University.

Hertel, T.W., Anderson, K., Francois, J. F. and Martin, W. (2000) Agriculture and non-agricultural liberalization in the Millenium Round, CIES discussion paper 0016.

Hertel, T.W. and M.E. Tsigas (1997) Structure of GTAP, published in T.W. Hertel (ed.), Global Trade Analysis: Modeling and Applications, Cambridge University Press, 1997.

Keeney, R. and T.W. Hertel (2005) GTAP-AGR: A Framework for Assessing the Implications of Multilateral Changes in Agricultural Policies, GTAP Technical Paper No.24.

Kniper, M. and C. dell'Aquila (2004) Euro-Mediterranean Partnership: State of affairs and key policy and research issues, Report 6.04.10, Agricultural Economics Research Institute (LEI), The Hague.

Martin, I. (2004) The Social Impact of Euro-Mediterranean Free Trade Areas: A First Approach with Special Reference to the Case of Morocco, *Mediterranean Politics*, 9(3), 422-458.

McDougall, R., A. Elbehri and T. Truong (1998) Global Trade, Assistance, and Protection: The GTAP 4 Data Base, Center for Global Trade Analysis, Purdue University. West Lafayette, IN.

Michalek, J. (2005) Comparative Analysis of Technical Barriers to Trade (TBT) for Central and Eastern European Countries' and Mediterranean Partner Countries' Exports to the EU, FEMISE, FEM 22-03, Femise 2 network.

Nabli, M.K. and M-A. Veganzones-Varoudakis (2004) How does exchange rate policy affect manufactured exports in MENA countries?, *Applied Economics*, **36(19)**, 2209-2219.

Siliverstovs, B. and D. Herzer (2007) Manufacturing exports, mining exports and growth: cointegration and causality analysis for Chile (1960-2001), *Applied Economics*, **39(2)**, 153-167.

The World Bank (2003) MENA Development Report Better Governance for Development in the Middle-East and North Africa.

Tongzon, J.L. (2001) China's membership in the World Trade Organization (WTO) and the exports of the developing economies of East Asia: a computable general equilibrium approach, *Applied Economics*, **33(15)**, 1943-1959.

Valenzuela, E., Anderson, K. and T.W. Hertel (2006) Impacts of Trade Reform: Sensitivity of GTAP Results to Modeling Assumptions, paper prepared for the 9th Annual Conference on Global Economic Analysis, UN Conference Centre, Addis Ababa, 15-17 June

Varian, Hal R. (1984) *Microeconomic Analysis*, Second Edition, New York and London: W.W. Norton & Company.

Table 1. MENA trade liberalization options: impacts on world production, GDP and welfare

	Scenario - 1 Global trade reform	Scenario - 2 Regional trade agreement	Scenario - 3 MENA: special provisions
	% change from the base year (1998)		
World trade value	39.73	1.46	3.34
World trade volume	23.32	0.92	2.12
<i>GDP (real terms)</i>			
Australia/New Zealand	0.53	0	0.02
Japan	0.09	0	0.00
United States	0.04	0	0.00
EU	0.08	0	0.00
MENA	-0.74	0	-0.01
Rest of the Americas	0.14	0	0.01
Rest of the World	-0.06	0	0.00
<i>Welfare</i>			
Australia/New Zealand	0.6783	-0.0033	0.03
Japan	0.2914	0.0005	0.00
United States	0.0429	-0.0004	0.00
EU	0.136	0.0090	0.01
MENA	-0.1514	0.1239	0.28
Rest of the Americas	0.2285	-0.0027	0.01
Rest of the World	0.1673	-0.0013	0.01

Table 2. MENA trade liberalization options: impacts on trade flows by

	Scenario - 1 Global trade reform	Scenario - 2 Regional trade agreement	Scenario - 3 MENA: special provisions
	% change from the base year (1998)		
<i>Exports in value</i>			
Australia/New Zealand	57.69	-0.21	2.26
Japan	35.65	-0.09	0.70
United States	44.78	-0.18	2.02
EU	44.00	5.10	4.32
MENA	29.57	16.26	35.10
Rest of the Americas	32.08	-0.23	1.65
Rest of the World	34.50	-0.28	1.48
<i>Exports in volume</i>			
Australia/New Zealand	35.14	-0.15	1.51
Japan	28.18	-0.06	0.47
United States	27.32	-0.12	1.29
EU	20.70	3.25	2.77
MENA	20.06	10.25	22.17
Rest of the Americas	18.97	-0.15	1.00
Rest of the World	21.34	-0.19	0.94
<i>Imports in value</i>			
Australia/New Zealand	18.69	-0.03	0.53
Japan	58.85	0.00	0.86
United States	16.66	0.00	0.40
EU	26.68	2.06	2.01
MENA	67.16	10.68	25.19
Rest of the Americas	31.84	-0.02	0.35
Rest of the World	45.95	0.01	1.16
<i>Imports in volume</i>			
Australia/New Zealand	11.72	-0.02	0.36
Japan	34.41	0.00	0.49
United States	10.23	0.00	0.24
EU	17.03	1.29	1.28
MENA	36.20	6.69	16.05
Rest of the Americas	19.70	-0.01	0.25
Rest of the World	27.01	0.01	0.75

Table 3. MENA trade liberalization options: commodity trade flows

	Scenario - 1 Global trade reform	Scenario - 2 Regional trade agreement	Scenario - 3 MENA: special provisions
	% change from the base year (1998)		
Exports value			
Food grains	92.96	39.07	137.97
Feed grains	35.71	26.67	46.38
Vegetables&Fruits	27.89	17.64	32.28
Oilseeds*	10.17	0.27	18.87
Other crops	14.89	1.95	16.81
Cattle	42.81	34.01	54.65
Other animals	15.88	8.65	17.48
Processed meat	70.40	50.85	79.79
Other processed meat	107.55	21.16	128.84
Processed oil	14.24	13.24	18.66
Other processed food	41.40	23.59	49.04
Beverages&Tobacco	16.18	5.12	22.18
Fishing	1.05	0.24	0.37
Non agricultural	1.23	0.15	0.36
Imports value			
Food grains	53.29	3.18	22.38
Feed grains	33.22	3.53	16.74
Vegetables&Fruits	148.43	9.89	46.25
Oilseeds*	30.80	0.37	14.43
Other crops	23.04	1.57	11.00
Cattle	76.18	15.55	29.80
Other animals	21.40	6.14	10.95
Processed meat	145.49	18.04	47.17
Other processed meat	117.34	19.61	37.29
Processed oil	28.30	2.09	13.03
Other processed food	63.54	17.44	26.57
Beverages&Tobacco	210.95	25.58	56.55
Fishing	-5.21	-0.45	-1.03
Non agricultural	-4.72	-0.39	-1.04

*Oilseeds includes: soybeans, olives and other oil producing crops.

Appendix:

The model developed in this study is based on the neoclassical growth theory, and is a static CGE model with a multi-regional and multi-sectoral specification.

Consumption/savings: In each region the representative household owns land, labor and all financial wealth (defined below) to seek to maximize utility. For reasons of simplicity, we assume no independent government investment. Government spends all its tax revenues on consumption or on transfers to households and, hence, fiscal deficits are ignored. The household's utility is:

$$MAX_u(TC_n) \quad (1)$$

TC_n , which is the aggregate consumption generated from final goods, is as follows:

$$TC_n = \prod_i C_{ni}^{a_{ni}} \quad (2)$$

where C_{ni} is final good i in region n , and $\sum_i a_{ni} = 1$. The household in each region maximizes (1) subject to a budget constraint:

$$Ptc_n TC_n \leq [(1 - ld_n)wld_n + (1 - lbt_n)wlb_n LB_n + TI_n] \quad (3)$$

where Ptc_n is consumer price index; wld_n is the land rental rate, wlb_n is the wage rate; TI_n is the lump sum transfer of government revenues; ld_n and lbt_n are household land and labor income tax, respectively.

Households allocate their total income flows, including financial and non-financial, between consumption and savings. The current budget constraint for the household is:

$$SAV_n = (1 - ldt_n)wld_n + LD_n + (1 - lbt_n)wlb_n LB_n + TI_n + (1 - kt_n)wk_n K_n - Ptc_n TC_n \quad (4)$$

where SAV_n is n -th region's household savings; wk_n is the current capital rental price and kt_n is the capital income tax rate; and $Ptc_n TC_n$ are total consumption expenditures.

The traditional Armington functions are all specified. For consumers or investors, goods imported from abroad or produced domestically are not identical. This imperfect substitution relation is reflected with an Armingtonian constant elasticity substitution (CES) function. Furthermore, it can be assumed that the goods consumed by consumers and used for investment are different and there are different substitution elasticities for goods produced at home and imported from abroad. To simplify the analysis, we assume that the composite goods used for consumption or for investment are same goods. Composite goods are also used as intermediate inputs in each production sector.